Low cost cataract detection system using smart phone

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***Abstract*— Cataracts are blinding retina of millions of people. Current test Cataract detection from retinal is expensive using fundus camera as the detection is the key reason for this is not portable, needs an expert to perform the operation. This paper presents a low-cost smartphone based on smart systems integration and micro lenses allows patients in remote areas to have regular eye checks and the innovative development of disease diagnosis. The official mobile diagnostic system to analysis of retinal images taken by microscopic lens to identify retinal disease conditions. Firstly we know that there are not very good medical facilities in remote areas and clinic in those area could not afford very costly machines which are required for the detection of cataract. Secondly time taken by the machine to detect cataract is more doctor could not attend more number of patience. So if we use smartphone by attaching perfect focal length lens with android application this will save cost and time.**

Keywords—cataract detection; android application; smartphone; microscopic lens

I. INTRODUCTION

Smartphone popularity and perception researchers have the opportunity to design and develop mobile applications. Particularly, mobile technologies are making new place in the health care field. For example handheld devices and smart phones are consider to be promising platform and offers cost-effective solutions and scalable manner, to a wide range of care, and ultimately improve the health outcomes of patients, due to their mobility[1]. So far, there are more than 10,000 health care applications is dedicated to intelligent cell phones and hundreds of other handheld devices[2]. As mobile technology, nursing anywhere possible in medical network field, such as for patient monitoring approaches, it is becoming a reality, it is no longer a medical practitioner is required to appear in person to monitor patients with, or acquisition of biological data. Moreover, research showed that diabetes and cataract is the key to lead to blindness the retina retinal disease. People living in remote regions may face blindness due to cataract. Android capture image by the microscopic lens attached with the Smartphone. Postoperative retinal image processing API has also been used to analyze the original image

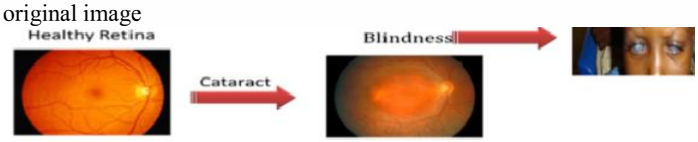

Fig 1 Healthy and infected retinal images that cause blindness

smart phone allows smartphone users to access low-cost regular eye examination and diagnosis of disease, there are no experts needed, at any time and any place.

II. RELATED WORK

In this section, we discuss PC and smart phone-based health and health-related decision support system for computer-aided diagnosis. Because optimization for mobile applications on the basis of a vital role, approach to the optimization and discussed.

A. Mobile-based diagnosis system

For mHealth applications and advances in mobile technology is feasible to provide health monitoring for Efficient solutions, Mobile-based intelligent health systems development (i.e. mHealth) is and the recent rise in research[3].

Number of medical fronts had a substantial progress in mobile technology. For example, development of modern Smart phone hardware technologies has provided on the mobile adaptation of health services more impetus. For example, from Zhu. Propose a prototype system using device with mobile a built-in camera[4]. The use of Android phone as alarm gateway implementation model proposed. Overall discussion above related work indicates that widely adopted use of

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mobile technology for the remote monitoring of important biological signals of telepathology, teledermatology, also drew attention[5][6] .

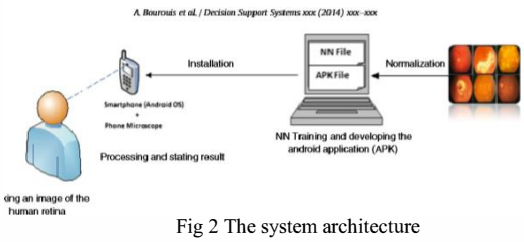

Fig 2 The system architecture

B. System optimization

Smartphone for the diagnosis of retinal problems . In this research we employ a modified Neural Network for the rooted method application. Network is neural training that runs a Java framework developed on a personal computer. Parameters of the network have the same topology (the weight matrices and the bias vectors representing the classification knowledge) applies as mobile development library of Mobile-based diagnostic system. Thus, we effectively maintains this mobile phone-based neural network diagnosis system reliability and Efficiency. In this study has the following unique characteristics: (1) captures high resolution retinal images with the microscope attached to the Smartphone. (2) retinal Neural local network anomalies and healthy, using Arti fi RGB image classification, i.e. normal and sensitive disease related retinal images; (3) platform and real-time detection of optimizing and exporting retinal disease detection using Android-based mobile . (4) to evaluate the Mobile-based intelligent solution efficiency to use the images from two medical retina image database.

III. THE MOBILE- BASED INTELLIGENT RETINAL DISEASE DIAGNOSIS SYSTEM

In mobile-based intelligent retinal disease diagnosis system, retinal image to analyze offers fully functional feature-rich software application , designed to run the diagnostic. Use neural network-based approach can be run on both the desktop computer and abnormal / normal retina image classification for Android-based mobile devices. Feed forward neural network algorithm trained to achieve real-time efficient solutions, first of all, the healthy and infected states. Then uses the dataset of the retina, on a desktop computer testing neural network's INA mobile device installed Android at thetrained systems (OS). Testing stage, using micro-lens and to collect users ' which is using retinal images, diagnostic, Android Smartphone, is attached. Benefits of using a microscope lens, performance for the diagnosis of allows the system to take clear retinal images . To provide intelligent solutions for Mobile-based efficient to perform various optimization techniques, real time diagnosis,considered in this study.

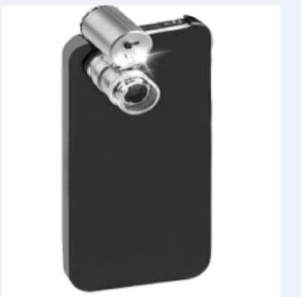

Fig 3 The Android phone with an external microscopic lens

Also, Google Android operation system both Linux and Windows to allow flexible portable version is available and will be selected for this application . Also, Android provides all good features such as device drivers network stack, memory and process management, and security to allow flexible, reliable, portable data storage and processing[7] . In present few years, computing resources in a real Smartphone is significantly faster, compared with mobile device generation, will be improved. Android OS and devices, computing is typically features approximately 1.2 GHz CPU and 512 MB operating memory. Such configuration can be to perform computing tasks more complex than data storage and transmission. Therefore, on smart phones such as Android provides developers additional Benefits.

Accelerated convergence of smartphones to promote technology development in the latest techniques and miniaturization and powerful computer. And integrated sensor suite, while increasing computing power of smart phones. Android also provides access to the low level component of the Smartphone operating system while using more powerful hardware (CPU or RAM) for more complete set. For example, using rooted method in order to increase the battery life time and the computational capacity duty cycle and the phone whenever we tear sensors to turn off non-active, our application is running our Android application that owns the highest priority. We to also apply the planned sleep function to conserve their energy, not active and while the activities both sensor and use the resource management API of Android.

For diagnosis of diseases of intensive and limit maximum CPU performance, with the rooted method, we can easily exceed these limitations, especially since the Smartphone, with phone processor power. To compensate the battery use of the processor, we suggest to prolong the battery life duty cycle algorithm. For all traffic conditions in field of duty cycle algorithm has been initially employed in the wireless sensor network . And achieve optimal network performance in The main idea of the algorithm is that it intends to balance successful data delivery delay constraint for a variety of applications to minimize the power consumption of human intervention. So it is not used in mobile based application environment for mobile mapping, duty cycle optimization is relatively difficult.

In our system can directly capture the Android handset employed has also been attached with microscope, which take

a microscopic retinal image by using our application. Employed in this study were fitted with mobile devices, commercial phone micro-lenses / 10060 will help to capture the retinal image quality for x. Android application programming interface (API), you can easily control access to the image processing functions and microscope apparatus with the external, integrated camera. For image drawing handling. Especially (filter and image formatting for example canvas, color, etc.), for example, the android graphics API provides low level graphics classes(eg Bitmap, BitmapFactory, cameras, canvas, etc) and the computer aided robust and scalable approach to providing automatic Diagnostics and tools, such as the extraction of retinal image quality.

IV. CONCLUSION

Integration of external microscope by using commercially available smartphone In this paper has presented an intelligent mobile-based retinal disease detection method. Proposed method was developed for the Android operating platform. In addition, the application is very easy to be operated by any mobile user and could be used remotely as an efficient low cost mobile solution for health monitoring at anytime. These features is noticeable compared to the complex and very expensive solution of the existing fundus camera .

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